

CAT4 Level E practice questions

CAT4 is a reasoning test made by GL Assessment, and Level E is its version for Year 8 and Grade 7. For each of its eight types of question, here is a worked example, which is already answered and explained, then a question for your child to try. The questions are free on cat4practice.com/cat4-level-e, where your child can also do them on screen.

How to use it

1. Read each worked example together. Its answer and explanation are right under it.
2. Then your child tries the next question without help, and circles one letter.
3. When all eight are done, check the answers at the back. Then read the explanations together, starting with any question your child got wrong.

The answers start on a new page, headed "Answer key", so your child does not see them by accident. To print without them, stop before that page.

What your child needs: a pencil and an eraser, and rough paper (spare paper for doing sums) for the two number tests, number analogies and number series. In the real test, children get rough paper for these two tests too.

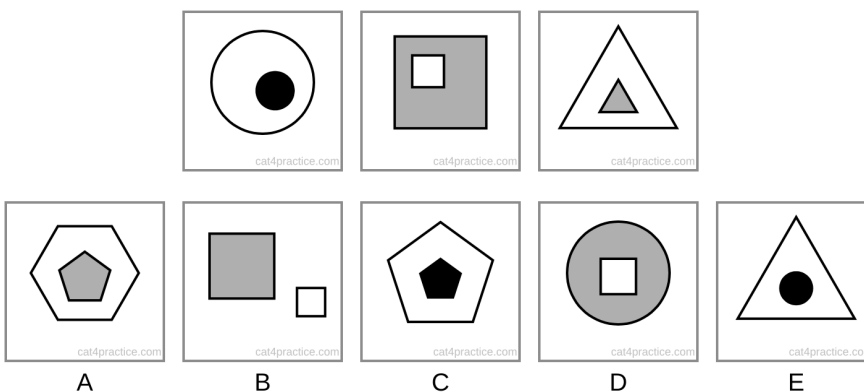
In the real test, each of the eight tests has a time limit. By our estimate, that leaves about 20 to 30 seconds for each question. For these questions, use no clock.

We wrote these questions ourselves, to match GL's description of each type. They are not GL's questions, and GL does not recommend any practice materials, including these. A result here is not a CAT4 score.

Figure classification

Look at the three figures (images) at the top. They are alike in some way. Which answer goes with them?

Worked example

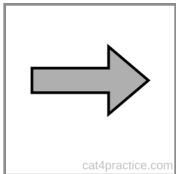
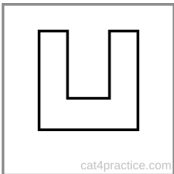
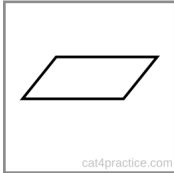


C.

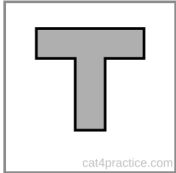
1. Each figure at the top has two parts, so compare the two parts with each other.
2. In each one a small copy of a shape sits inside a big one of the same shape: a small circle inside a circle, a small square inside a square, a small triangle inside a triangle.
3. The colours change from figure to figure, and so does where the small shape sits, so they do not matter.
4. C has a small pentagon (5 sides) inside a big pentagon: the same shape, and inside.
 - **A:** A has a small pentagon (5 sides) inside a hexagon (6 sides). Count the sides: they are not the same shape.
 - **B:** B has a small square and a big square, but the small square is outside the big one, below it and to the right. In every figure at the top the small shape is inside.
 - **D:** D has a small square inside a circle: two different shapes.
 - **E:** E has a small circle inside a triangle: two different shapes.

Next time: When each figure has two parts, compare the parts with each other: are they the same shape? Is one inside the other? Then check every answer for both.

Question 1



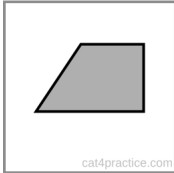
A



B



C



D

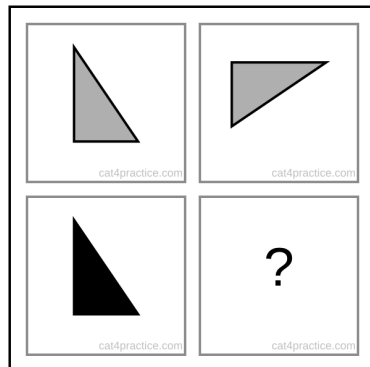
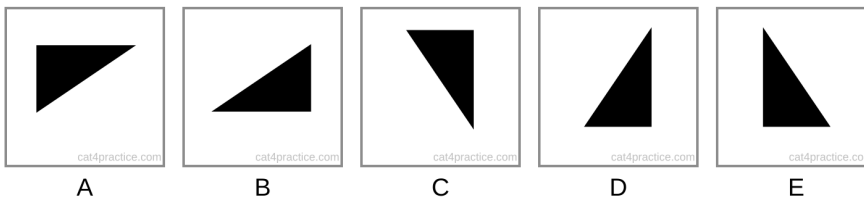


E

Figure matrices

Which answer goes in the box with the question mark? The top two images show a change. Make the same change to the image on the left of the question mark.

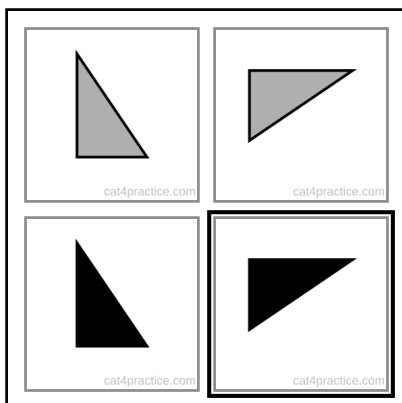
Worked example



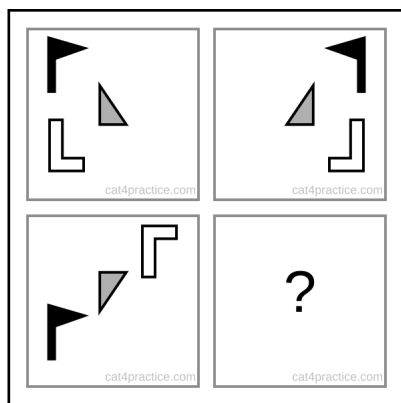
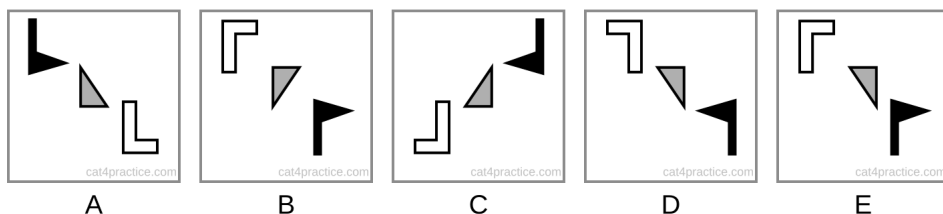
A.

1. Look at the square corner (the right angle) of each grey triangle in the top row. In the first image it is at the bottom left; in the second it is at the top left. The triangle has turned a quarter of the way round, clockwise (the way a clock's hands go). Of the two sides that meet at the square corner, the longer one went up from it, and now goes right along the top.
 2. The colour stays the same: grey stays grey.
 3. The black triangle on the left of the question mark is drawn exactly like the first grey one, but black. Turn it a quarter of the way round clockwise and keep it black: its square corner moves to the top left, and its longer side goes right along the top: A.
- **B:** B is turned a quarter of the way round the other way (anticlockwise): its square corner moves to the bottom right.
 - **C:** C is turned half way round: its square corner moves to the top right. That is two quarter turns, not one.
 - **D:** D is a mirror image of the black triangle (flipped left to right), not turned: its square corner is at the bottom right, and its longer side still goes up. This triangle has no mirror line, so no turn of it looks like its mirror image.
 - **E:** E is the black triangle with no change at all.

Next time: To see a turn, follow one corner you can always find (here the square corner) and say where it goes, and which way round. Then move the same corner of the shape on the left of the question mark the same way.



Question 2



Verbal classification

The three words in **bold** (dark letters) are alike in some way. Which answer is another one of the same kind? The answer is not the name for the whole group. For example, for pear, plum and mango, the answer would be another fruit, not the word "fruit".

Worked example

hurricane blizzard thunderstorm

A storm B wind C sunshine D tornado E umbrella

D. A hurricane, a blizzard and a thunderstorm are all kinds of storm: very bad weather. A hurricane brings very strong wind, a blizzard is a snowstorm, and a thunderstorm brings thunder and lightning. A tornado is a kind of storm too: a violent storm in which the wind spins in a tall column.

- **A:** "Storm" is the word for all of them together. The answer must be one more kind of storm, not the name of the whole group.
- **B:** Wind is moving air. Strong wind is part of many storms, but "wind" is not the name of a kind of storm, and most wind is no storm at all.
- **C:** Sunshine is weather too, but it is not a storm. The three words are not just kinds of weather: they are all kinds of storm.
- **E:** You might take an umbrella out in a storm, but an umbrella is a thing you carry, not a kind of storm.

Next time: Name the group as exactly as you can ("kinds of storm", not just "weather"). Then check that the answer is one more of that group, not the group's name or something that goes with it.

Question 3

cube sphere cylinder

A rectangle B circle C triangle D shape E cone

Verbal analogies

The first two words are linked in some way. Which answer is linked to the third word in the same way?

Worked example

sheep → flock : bee →

A queen B swarm C honey D sting E insect

B. A flock is a group of sheep. In the same way, a swarm is a group of bees.

- A: A queen is one bee, the one that lays the eggs, not a group of bees. The pair goes from an animal to the word for a group of them.
- C: Bees make honey, but honey is not a group of bees.
- D: A bee can sting, but a sting is not a group of bees.
- E: A bee is an insect: "insect" is the kind of animal a bee is, not a group of bees.

Next time: Make a sentence for the pair: "A flock is a group of sheep." Then make the same sentence with the third word: "A ____ is a group of bees." Only one answer fits.

Question 4

island → sea : oasis →

A palm B camel C desert D shade E thirst

Number analogies

In each pair, the second number is made from the first in the same way. Which answer completes the last pair?

Worked example

[3 → 11] [5 → 17] [8 → ?]

A 24 B 16 C 30 D 20 E 26

E.

1. Adding the same number does not work for both pairs: $3 + 8 = 11$, but $5 + 8 = 13$, not 17. Multiplying by one number does not work either: no whole number times 3 makes 11. So try a rule with two steps.
 2. Compare the pairs. The first numbers of the pairs, 3 and 5, are 2 apart. Their second numbers, 11 and 17, are 6 apart. 6 is 3 times 2, so the rule multiplies by 3.
 3. Then find what else the rule does: $3 \times 3 = 9$, and 11 is 2 more than 9. So the rule is: multiply by 3, then add 2. Check it on the second pair: $5 \times 3 = 15$, and $15 + 2 = 17$.
 4. Use it on 8: $8 \times 3 = 24$, and $24 + 2 = 26$: E.
- A: 24 is 8×3 . It does the first step and forgets the second: add 2.
 - B: 16 is $8 + 8$. Adding 8 works for the first pair ($3 + 8 = 11$), but not for the second: $5 + 8 = 13$, not 17.
 - C: 30 is $(8 + 2) \times 3$: the same two steps in the other order, with the same numbers. Check it on the first pair: $3 + 2 = 5$, and $5 \times 3 = 15$, not 11.
 - D: 20 is $8 + 12$. Adding 12 works for the second pair ($5 + 12 = 17$), but not for the first: $3 + 12 = 15$, not 11. (20 is also $17 + 3$, as if 8 being 3 more than 5 made the answer 3 more than 17. But the rule works inside each pair, from its first number to its second.)

Next time: If neither adding one number nor multiplying by one number fits both pairs, try two steps. Compare the pairs to find the number to multiply by, then find what to add or take away.

Question 5

[4 → 15] [7 → 48] [9 → ?]

A 80 B 35 C 81 D 20 E 50

Number series

These numbers are a series: they follow a rule. Which number comes next?

Worked example

10 16 21 25 28 →

A 31 **B** 26 **C** 30 **D** 34 **E** 29

C.

1. The numbers go up, but not by the same amount each time. Write the jump from each number to the next: + 6, + 5, + 4, + 3.
 2. The jumps get 1 smaller each time, so the next jump is + 2.
 3. The next number is $28 + 2 = 30$: **C**.
- **A:** 31 is $28 + 3$: it repeats the last jump. The jumps get 1 smaller each time.
 - **B:** 26 is $28 - 2$: it takes 2 away. The jumps get smaller, but each one still adds: the numbers keep going up.
 - **D:** 34 is $28 + 6$: it starts the jumps again from + 6.
 - **E:** 29 is $28 + 1$. The last jump was + 3, so the next jump is + 2, not + 1.

Next time: If the numbers do not go up by the same amount each time, write the jumps between them. Then look for a rule in the jumps.

Question 6

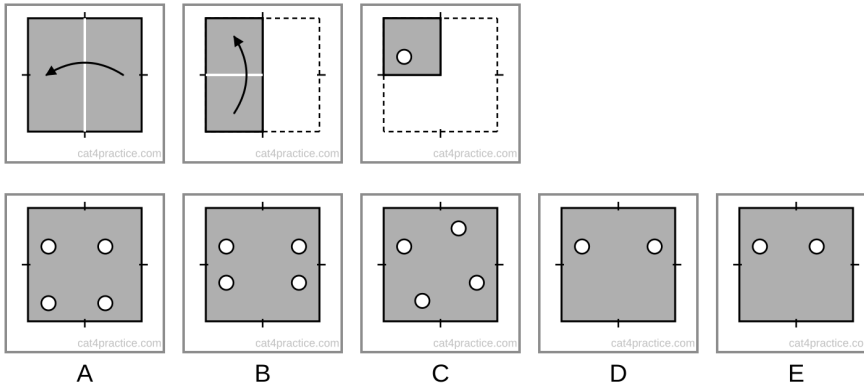
72 40 24 16 12 10 →

A 5 **B** 14 **C** 1 **D** 9 **E** 8

Figure analysis

A square of paper is folded. Then one or more holes are punched through the folded paper, through every layer. Which answer shows the paper when it is unfolded?

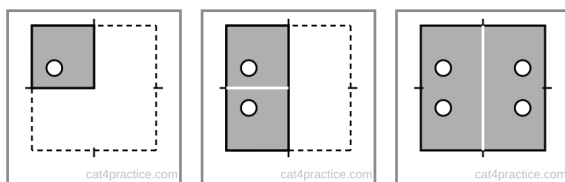
Worked example



B.

- Count the layers: two folds, each in half, so the hole goes through 4 layers. There will be 4 holes.
- Undo the last fold first: the bottom half folds back down. The hole gets a matching hole in the bottom half, as far below the fold line as the hole is above it.
- Then undo the first fold: the right half folds back. Each hole gets a matching hole in the right half, as far from the upright fold line as it is.
- The 4 holes make a rectangle, two near the left edge and two near the right edge: B.
 - A:** A copies the hole into each quarter without flipping it, so the copies are in the wrong places: the right-hand holes are too near the upright fold line, and the lower holes too near the bottom edge. A fold makes a mirror image across the fold line.
 - C:** C turns the hole round the middle of the paper instead of flipping it across each fold line.
 - D:** D forgets the second fold (the bottom half folded up), so it has no holes in the bottom half.
 - E:** E forgets the second fold too, and it copies the hole into the right half instead of flipping it.

Next time: Undo the folds one at a time, last fold first. Each time, every hole gets a matching hole on the other side of that fold line, the same distance from it.



Question 7

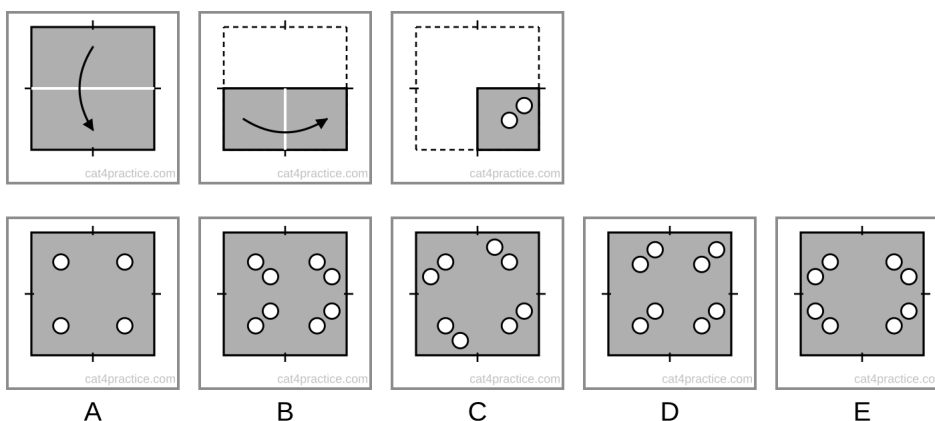
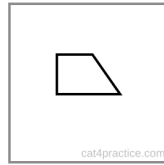
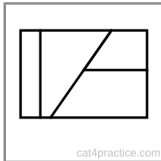


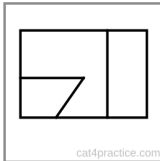
Figure recognition

Which image hides the shape at the top? It is the same size and faces the same way: not turned round, and not a mirror image. Each of its sides is drawn in that image, as a whole line or as part of a longer line. (In the real test, the shape is drawn below the five images.)

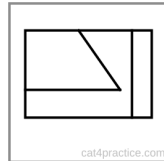
Worked example



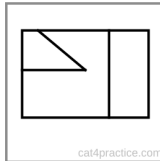
A



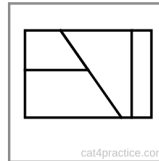
B



C



D

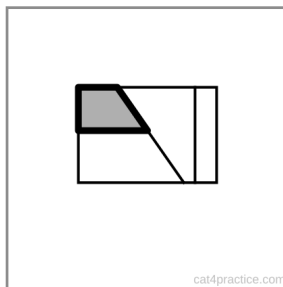


E

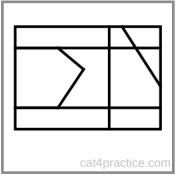
E.

1. Start with the shape's most unusual side: its sloping right side, which leans out to the right as it goes down.
 2. In E that sloping line starts on the top edge and goes down to the right. It carries on past the shape to the bottom edge of the black rectangle, but only its top part is a side of the shape.
 3. The shape's top is part of the top edge, its left side is part of the left edge, and its bottom is the flat line inside E, which ends where it meets the sloping line: E.
- **A:** A has the shape as a mirror image: its sloping side is on the left.
 - **B:** B has the shape as a mirror image from top to bottom (like a reflection in water): its sloping side leans in, not out, as it goes down.
 - **C:** C has the same shape, but bigger: about one and a half times as wide and as tall.
 - **D:** D has a shape with a much shorter top, so its sloping side is longer and leans more.

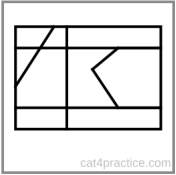
Next time: Find the shape's most unusual side first, then look in each image for a line that leans the same way. The side may be only part of a longer line, so check where the shape's corners are.



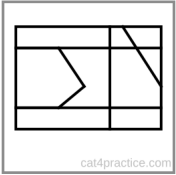
Question 8



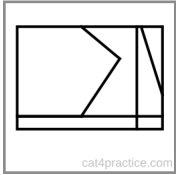
A



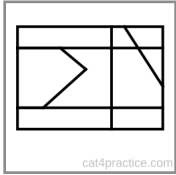
B



C



D



E

Answer key

Question	Type	Answer
1	Figure classification	B
2	Figure matrices	D
3	Verbal classification	E
4	Verbal analogies	C
5	Number analogies	A
6	Number series	D
7	Figure analysis	E
8	Figure recognition	A

Answers explained

Question 1

B. Each figure has a mirror line (a line of symmetry). A mirror line cuts a shape into two halves that are mirror images: if you folded the shape along the line, the halves would match. For the arrow the line goes straight across, through its point; for the U shape and the kite it goes straight down the middle. The shapes, their colours and their numbers of sides all change. B, the T shape, has a mirror line straight down the middle.

- **A:** A (a parallelogram, a four-sided shape that leans) looks the same on both sides at first glance, but it has no mirror line: fold it down the middle, across the middle or from corner to corner, and the halves do not match.
- **C:** C, the L shape, has no mirror line: its long arm goes up on the left and its short arm goes along the bottom to the right. Fold it any way and the halves do not match.
- **D:** D has one upright side and one sloping side, so its left and right halves do not match; its top is shorter than its bottom, so its top and bottom halves do not match either: no mirror line.
- **E:** E looks like a house, but the point of its roof is to the right of the middle, so its two halves do not match: no mirror line.

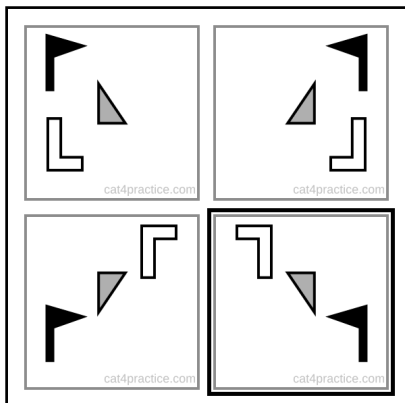
Next time: When the shapes all look different, check each one for a mirror line: imagine folding it down the middle, across the middle, and from corner to corner. A shape can look the same on both sides at first glance without having one.

Question 2

D.

1. The second image in the top row is a mirror image of the first, as if a mirror stood on a line straight down the middle of the box (the mirror line): left and right swap, and the top stays at the top.
 2. The flag and the L move to the other side, and each now faces the other way: the flag points left, and the L's short arm points left.
 3. The mirror line goes through the middle of the grey triangle, so the triangle stays in the middle. But the triangle is flipped too: its upright side moves from the left to the right.
 4. Do the same to the image on the left of the question mark. The flag moves to the bottom right and now points left. The L moves to the top left; its short arm stays at the top and now points left. The triangle stays in the middle; its upright side moves to the right, and its square corner stays at the top: D.
- **A:** A is a mirror image with the mirror line lying flat across the middle: top and bottom swap, so the flag is now at the top left, with its cloth at the bottom of its pole. In the top row the mirror line goes straight down: left and right swap, and the top stays at the top.
 - **B:** In B the flag and the L move to the other side, but they still face the same way: the flag still points right. The triangle has not changed at all. In the top row every shape is flipped, and the flag and the L also move to the other side.
 - **C:** C shows the image on the left of the question mark after a half turn, as a wheel turns: left and right swap, but top and bottom swap too, so the flag is now at the top right, with its cloth at the bottom of its pole. In the top row the top stays at the top.
 - **E:** In E the triangle is flipped (its upright side is now on the right), but the flag and the L have only moved across: the flag still points right, and the L's short arm still points right. In the top row every shape is flipped, and the flag and the L also move to the other side.

Next time: When the whole image changes, follow every shape: where does it go, and which way does it face? In a mirror image, a shape in the middle, on the mirror line, stays in the middle, but it is still flipped.



Question 3

E. A cube, a sphere and a cylinder are all 3-D (solid) shapes: shapes that are not flat. A cone is a 3-D shape too, like an ice-cream cone.

- **A:** A rectangle is a shape, but a flat one: it has a length and a width but no thickness.
- **B:** A circle is a shape, but a flat one. A cylinder has a circle at each end, but a circle itself is flat.
- **C:** A triangle is a shape, but a flat one. A 3-D shape can have triangles on it (a pyramid does), but a triangle itself is flat.
- **D:** "Shape" is a wider group: it takes in flat shapes too. The answer must be one more 3-D shape, not the name of a group.

Next time: Name the group as exactly as you can: not just "shapes" but "3-D (solid) shapes". Then answers from the wider group (flat shapes) are easy to rule out.

Question 4

C. An island has water all round it; here, the sea. In the same way, an oasis has a desert all round it: an oasis is a place in a desert where there is water, so plants can grow there.

- **A:** A palm (a palm tree) grows in an oasis. Palm trees are in the oasis. They are not all round the oasis, the way the sea is all round the island.
- **B:** A camel may stop at an oasis to drink. But a camel is an animal that comes to the oasis, not what is all round the oasis.
- **D:** The palm trees of an oasis give shade (a cool place out of the sun), but the shade is in the oasis, not all round the oasis.
- **E:** Thirst is the feeling of needing a drink. Thirsty travellers look for an oasis, but thirst is a feeling, not what is all round the oasis.

Next time: Make a sentence that says how the first two words are linked: "The island has the sea all round it." Then make the same sentence with the third word: "The oasis has ____ all round it." Words that belong with the third word (all four wrong answers here) may still not fit the sentence.

Question 5

A. Each second number is 1 less than a square number (a number multiplied by itself): 15 is 1 less than 16, and 16 is 4×4 ; 48 is 1 less than 49, and 49 is 7×7 . So the rule is: multiply the number by itself, then take away 1. $9 \times 9 = 81$, and $81 - 1 = 80$.

- **B:** 35 is $9 \times 4 - 1$. "Multiply by 4, then take away 1" works for the first pair ($4 \times 4 - 1 = 15$), but not for the second: $7 \times 4 - 1 = 27$, not 48.
- **C:** 81 is 9×9 . It does the first step and forgets to take away 1.
- **D:** 20 is $9 + 11$. Adding 11 works for the first pair ($4 + 11 = 15$), but not for the second: $7 + 11 = 18$, not 48.
- **E:** 50 is $9 + 41$. Adding 41 works for the second pair ($7 + 41 = 48$), but not for the first: $4 + 41 = 45$, not 15. (50 is also $48 + 2$, as if 9 being 2 more than 7 made the answer 2 more than 48. But the rule works inside each pair, from its first number to its second.)

Next time: Know the square numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100. When the second numbers are just above or just below them, try multiplying each first number by itself.

Question 6

D. Write the jumps between the numbers: $-32, -16, -8, -4, -2$. Each jump takes away half as much as the one before, so the next jump takes away 1, and the next number is $10 - 1 = 9$.

- **A:** 5 is half of 10: it halves the last number. Halving the numbers does not work: half of 40 is 20, not 24.
- **B:** 14 is $10 + 4$: it goes up, but the numbers keep going down, by less each time.
- **C:** 1 is the amount the next jump takes away, not the next number. Take it away from 10: $10 - 1 = 9$.
- **E:** 8 is $10 - 2$: it repeats the last jump. Each jump takes away half as much as the one before, so the next takes away 1, not 2.

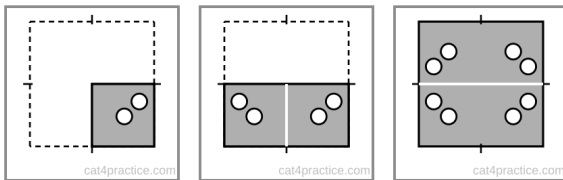
Next time: If the numbers go down by less and less, write the jumps between them and look for a rule in the jumps: here each jump takes away half as much as the one before.

Question 7

E. Two folds in half, so each hole goes through 4 layers: the 2 holes punched make 8. Undo the last fold first: the left half folds back, and each hole gets a matching hole in the left half, as far from the upright fold line as it is. Then undo the first fold: the top half folds back up, and every hole gets a matching hole in the top half, as far from the fold line across the middle as it is. The hole in the middle of the small square makes 4 holes, one in the middle of each quarter. The hole near the small square's top right corner makes 4 holes near the left and right edges of the paper, two just above the fold line across the middle and two just below: E.

- **A:** A has only the 4 holes made by the hole in the middle of the small square. It forgets the second hole, the one near its top right corner.
- **B:** B flips the holes into the top half, but copies them into the left half without flipping: the left half is the same as the right half, so two of its holes are by the upright fold line, not by the left edge.
- **C:** C turns the holes round the middle of the paper, a quarter turn at a time, instead of flipping them: two of its holes are by the top and bottom edges, not by the left and right edges.
- **D:** D copies the holes into the other three quarters without flipping them, so every quarter looks the same as the small square. A fold makes a mirror image: each quarter is a mirror image of the one beside it.

Next time: With two holes, unfold each one on its own. Here the paper is folded in half twice, so each hole makes 4 holes, one in each quarter, and each quarter is a mirror image of the quarter beside it.



Question 8

A. The shape is on the left of A. Its left side is part of the left edge of the black rectangle. Its top and its bottom are parts of the two long lines that go right across the rectangle, from edge to edge. Its point is made by two sloping lines, a short one above and a longer one below, so the point is nearer the top than the bottom, as in the shape to find.

- **B:** B has the shape as a mirror image: it points left.
- **C:** C has the shape as a mirror image from top to bottom (like a reflection in water): its point is nearer the bottom, with the longer sloping line above.
- **D:** D has the same shape, but bigger: about one and a half times as wide and as tall.
- **E:** E has a shape with a shorter bottom, so its lower sloping line is longer and leans more.

Next time: When long lines run from edge to edge, a side of the shape may be only part of one. Find the shape's corners where lines meet, then check each side between them, its length and which way it leans.

